

BUILDING 707/707A DECOMMISSIONING BASIS FOR INTERIM OPERATION (DBIO)

CHAPTER 4

FACILITY ACTIVITIES

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None.

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None.

4.0 FACILITY ACTIVITIES

The following section describes the activities to be conducted during closure of the 707/707A Complex. Baseline and decommissioning activities have been grouped into the following five categories:

- Administrative Operations (Page 4-1);
- General Facility Operations (Page 4-2);
- Hazardous Material Handling (Page 4-4);
- Radioactive Waste Generation and Handling (Page 4-5);
- Decommissioning – Decontaminate, Dismantle, and Demolish (Page 4-10).

The types of activities contained in each category are briefly described and then followed by a list of representative activities. The activities are primarily defined by example rather than by descriptive text. The lists of representative activities are not all inclusive, but they identify the essential qualities and scope of activities. In addition, more detailed discussions are provided for important activities or configurations that explain or support assumptions in the accident analysis. Steps identified in the discussions help provide an understanding of the activities, but are not mandatory controls or the only method of performing the activity.

4.1 ADMINISTRATIVE OPERATIONS

Administrative Operations are activities that do not deal directly or indirectly with hazardous materials, but are performed to support the operation of the facility. These activities are primarily administrative, training, and technical support activities.

4.1.1 Representative Activities

Examples of activities performed under Administrative Operations are listed below:

- managing records and controlling documents dealing with the facility;
- preparing, providing, and tracking training for facility personnel;

- planning work activities;
- maintaining the facility authorization basis and evaluating new activities;
- managing the facility and providing technical support to operations;
- monitoring work status and tracking system configurations; and
- maintaining data bases associated with chemical, hazardous material, and waste inventories.

4.2 GENERAL FACILITY OPERATIONS

General Facility Operations include activities needed to keep the facility safe, habitable, functional, or compliant with applicable requirements. These activities are intended to cover a significant portion of what is generally termed Baseline Activities. These activities could involve or interact with equipment or structures that are contaminated, but do not require specific controls to reduce risk.

4.2.1 Representative Activities

Examples of activities performed under General Facility Operations are listed below.

- Step-off pad operations including surveying personnel and handling or moving laundry;
- Operating, monitoring and controlling facility systems including utilities, safety systems, and support systems;
- Performing preventive or corrective maintenance; calibration; and repairing/testing utilities, safety systems, and support systems;
- Performing TSR surveillances, inspecting systems, and monitoring equipment;
- Receiving, shipping, unloading, and moving equipment and supplies including empty waste containers;
- Shipping or transporting free-release waste;
- Safely storing radiological material and radioactive waste;

- Receiving, handling, and storing non-reactive chemicals;
- Performing RCRA, CERCLA, flammable gas, and other programmatic inspections;
- General housekeeping, managing or removing combustible materials (but not inside gloveboxes or chainveyors), touring the facility, and inspecting hazardous materials;
- General construction activities that take place outside the facility and do not interface with or affect 707/707A, or associated safety systems. Examples include: installing construction trailers, building containment structures outside facilities, installing fences, and soil sampling;
- Outside operations including emptying dumpsters (e.g., using trash trucks), unloading and moving equipment, filling propane tanks (using propane trucks), unloading and moving supplies (e.g., using forklifts), and other general support activities;
- Non-intrusive inspection of stored/staged waste containers per programmatic requirements;
- Performing radiological surveys; and
- Transferring and moving contaminated equipment (e.g., tools) and material (e.g., laundry);

4.3 HAZARDOUS MATERIAL HANDLING

Most of the waste chemicals have been removed from the facilities prior to the implementation of this document, but hazardous chemicals and materials may still exist or may be brought in and used to support decommissioning activities. Chemicals that are needed to support decommissioning activities will be managed in accordance with the Chemical Management Manual, which implements a comprehensive process for procurement, inventory tracking, storage, and disposal of hazardous chemicals. Hazardous Material Handling activities involve using, handling, and moving hazardous chemicals and materials. These activities could involve or interact with equipment or structures that are contaminated or contain holdup.

Hazardous materials (e.g., asbestos, lead, beryllium, acids, caustics, and PCBs) that exist in the facilities must be removed as part of decommissioning. Systems and equipment containing

hazardous materials are located throughout the facility. A large portion of this activity deals with the abatement and removal of asbestos-containing materials.

4.3.1 Representative Activities

The hazardous chemicals and materials located in the 707/707A Complex at the time this document was prepared are listed in Chapter 5, Hazard Identification and Analysis.

Examples of activities performed under Hazardous Material Handling are listed below:

- Sampling, characterizing, and disposing of hazardous chemicals and materials in the facility;
- Stabilizing and/or removing hazardous chemicals from the facility;
- Removing equipment and oils containing PCBs (e.g., ballasts, capacitors);
- Removing components containing mercury (e.g., switches, thermometers);
- Abating and removing asbestos containing materials;
- Abating and removing lead containing materials;
- Abating and removing beryllium contaminated materials; and
- Closing RCRA and CERCLA units.

4.4 RADIOACTIVE WASTE GENERATION AND HANDLING

Radioactive Waste Generation and Handling activities deal primarily with moving radioactive waste containers generated by General Facility Operations and Decommissioning Activities.

Various types of waste that will be generated in the facility activities include:

- Surface Contaminated Objects (SCO);
- Low-Level Waste;
- Low-Level Mixed Waste;
- Transuranic (TRU) waste; and

- **TRU Mixed waste**

Forms of radioactive waste primarily include metal (e.g., gloveboxes, tanks, piping, ductwork, plenums), concrete (e.g., walls, floors, roof), plastic (e.g., glovebox windows, breathing air suits, tents), filter media (e.g., HEPA filters), rubber (e.g., gloves, gaskets), and glass (e.g., glovebox windows, raschig rings).

Radioactive contaminated liquids and sludge will generally be drained, pumped, or removed as required from piping, gloveboxes, and tanks. Radioactive contaminated aqueous and organic liquids will also be generated when performing hydrolancing, steam cleaning, hydrolasing, and other decontamination activities. These wastes will be collected in approved containers, processed as necessary, and packaged in waste containers.

Radioactive Waste Generation and Handling activities also cover transferring contaminated equipment or waste between work areas (e.g., within Building 707/707A or to Building 777 through Building 778 or from the 707 dock).

Radioactively contaminated waste (exempt quantities of fissile material; Ref. 4-4) generated during General Facility Operations may be packaged while Radioactive Waste Generation and Handling activities are suspended when required by the DBIO Technical Safety Requirements (See Section 4.2.1).

4.4.1 Representative Activities

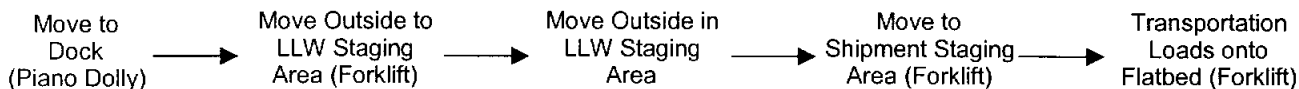
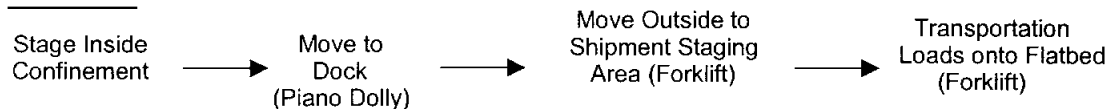
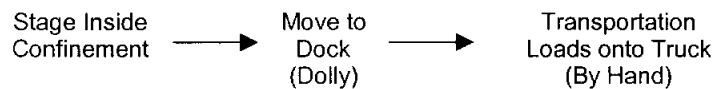
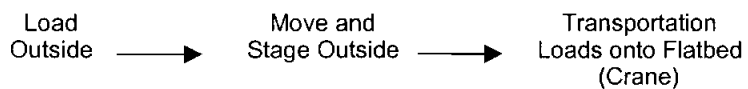
Examples of activities performed under Radioactive Waste Generation and Handling are listed below:

- Final packaging and closure of waste containers;
- Moving waste containers or components within the facility from generation points to storage or staging areas using pallet jacks, hand trucks, dollies, lift tables, etc.;
- Transferring non-TRU process waste liquids and decontamination solutions to Building 374 or an alternate On-Site receiver facility.
- Managing/filling waste containers inside and outside confinement;

- Handling waste components inside and outside confinement;
- Movement of waste containers and components, inside or outside of confinement.
- Removing waste from the facility through airlocks, SCO vestibules, and openings. This may involve hand carrying or using carts, dollies, lift tables, etc.;
- Receiving, moving, and repacking legacy waste or waste returned to the Building 707/707A Complex;
- Loading waste containers on transportation vehicles;
- Handling waste that is not in final form or packaging (e.g., drained liquids, tank sludge, glovebox sweepings, plenum holdup); and
- Handling and treating liquids and sludges.

Various modules, or areas, will be used for storing or staging full waste containers until they are shipped. These areas may also be used for final closure and finishing paperwork.. Waste containers generated while dismantling equipment or structures in an area may be staged in that area pending movement to a waste staging area.

Radioactive waste containers may be staged/stored inside the facility awaiting transfer to an on-site storage/transportation facility or, direct transportation to an off-site disposal facility. The following diagrams provide an overview of how various waste containers may be staged, moved, and shipped.

LLW and TRU Drums**LLW Boxes (IP-2)****TRU SWBs****10-Gallon (or other DOT-Approved) Drums****SCO Cargos (IP-1)**

4.4.2 Removing Waste from Facility

Dismantling Buildings 707/707A and outside facilities requires that all systems and equipment in the facilities are packaged and removed from the facility. Removing large amounts of waste and waste containers from the facility requires doors to be opened or use of configurations that challenge the periphery containment barriers differently than the production mission of the facilities. This section discusses the different configurations used to remove waste from the facility.

Airlocks

Airlocks generally consist of rooms with doors on either end. Only one of the doors (interior or exterior) is generally opened at a time when entering or exiting through the airlock. The set of doors that remains closed minimizes the air in-leakage and maintains the pressure differential between the interior and exterior of the facility to maintain airflow into the facility.

Building 707 currently has airlocks in Rooms 185 and 197 (Building 707 Dock) used to remove waste or waste containers from within periphery confinement areas. Groups of waste containers will be staged in the airlock with the interior door closed. While the exterior door is open during transfers, the pressure differential in the airlock will be lost while the containers are moved outside. During this time, the pressure differential between primary confinement (now the inner airlock door) and atmosphere is maintained.

Existing airlocks may be modified (e.g., add an additional set of doors to increase size) and new airlocks may also be constructed to more effectively remove waste or waste containers from the facility. For example, Room 185 may be expanded to a larger dock staging/shipping area airlock by opening the inside rollup door and closing the Room 184 door to corridor F to create a single area consisting of Rooms 184, 185, and 185A.

SCO Vestibules

Surface Contaminated Object (SCO) Vestibules are enclosures that may be connected to the outside of the facility where SCO cargo containers can be attached to the facility. The

vestibule allows SCO waste to be removed from the facility and placed in large cargo containers that can not be brought into the facility. The vestibules may be made of various material (e.g., fire retardant plywood, plastic, corrugated metal, or concrete block). Plastic and tape are generally used to form a seal between the container and the vestibule. A door in the facility periphery barrier provides access to the vestibule and waste container. The vestibule may be used to control access between the periphery door and the container, and provides a boundary for radiological monitoring and surveys.

Components and equipment that are confirmed to meet SCO waste criteria are moved through the periphery door and into the vestibule where they are staged or placed inside the SCO cargo container. When the periphery door is open, the vestibule and waste container form the periphery barrier and maintain the pressure differential. The periphery door may be open for long periods of time while the containers are loaded.

SCO vestibules when used, may be constructed against the periphery confinement barrier, and may be located where other structures currently exist.

Openings

Openings are simply openings created in the exterior walls, or roof, to remove waste from the facility when existing doorways are not large enough to accommodate the larger waste packages/components. Openings may be made in areas that do not contain TRU waste to remove equipment or waste generated during structural decontamination. Free-release, SCO, LLW, and some TRU waste (e.g., pipe stubs in walls) may be generated during structural decontamination. Equipment and waste containers will be moved or lifted out through openings areas using dollies, forklifts, cranes, etc. (See Technical Safety Requirements Section 5.5.).

4.4.3 Shipping Waste Containers

Moving, handling, and staging activities inside 707/707A, 778, or on the dock are covered by the 707/707A DBIO. The Site SAR covers waste containers as they are being moved off the dock, and loaded onto, and moved by a transportation vehicle, or moved outside the 707/707A

area. Transportation vehicles may include various size highway trucks or powered industrial trucks (fork lifts). Waste containers used for shipping radiological waste from the facility meet the requirements of the *Site SAR* (Ref. 4-1) and *Rocky Flats Site Transportation Safety Manual* (Ref. 4-2).

In-process waste containers are waste containers that are in the process of being filled, containers that are partially filled and waiting to be sealed (temporary lids or lids set in place), or containers that are full and are waiting for final closure (lids set in place). Once a waste container is filled, waste crew personnel put the lids on, tighten the lids (e.g., torque bolts, crimp tabs), move the containers to storage or staging areas, and finish the paperwork. Not all waste will be in final form or packaging and may require further treatment (e.g., drained liquids, glovebox sweepings, and plenum sweepings). Waste components that require decontamination, size reduction, or other special handling requirements are discussed in Section 4.5, Decommissioning.

4.5 DECOMMISSIONING – DECONTAMINATE, DISMANTLE, AND DEMOLISH

Decommissioning activities deal directly with disassembling and size reducing systems, structures, and components (SSCs) and packaging them into waste containers.

Decommissioning activities will generate free-release waste, radioactive waste (including Mixed waste), and non-radioactive hazardous waste. Decommissioning activities cover a significant portion of the activities associated with closure of the 707/707A Complex.

4.5.1 Representative Activities

Examples of activities performed under the Decommissioning Activity are listed below. The hazards associated with these activities are addressed in the *Building 707 Preliminary Hazards Analysis* (Ref. 4-3). The sequence of activities will be determined by work control documents.

- sample and characterize components, structures, and materials (e.g., sample solutions, sample sludges, ductwork coupons, concrete core samples).
- general construction activities that interface with safety systems or structures. Examples include: modifying electrical power systems and periphery confinement structures;

- remove piping – tap and drain, cut and remove, wrap/contain, move, stage, and size reduce piping with radioactive solutions, holdup, contamination, and/or reactive chemicals;
- remove gloveboxes/chainveyors – remove internal components, decontaminate, apply fixative coating, disconnect, wrap/contain, move, stage, and size reduce glovebox lines with radioactive holdup or contamination;
- remove tanks – drain, remove sludge, remove raschig rings, disconnect, disassemble, wrap/contain, move, stage, and size reduce tanks and other equipment with radioactive liquid/organic waste, holdup, contamination, and/or chemicals;
- remove ductwork – decontaminate, apply fixative coating, disassemble, wrap/contain, move, stage, and size reduce ventilation ductwork containing radioactive holdup and/or contamination;
- remove filter plenums – remove HEPA filters, decontaminate, contain, and size reduce filter plenums;
- decontaminate, remove, and size reduce contaminated walls, floors, and concrete ceilings (includes draining water from water walls);
- drain and recover radioactive and reactive liquids in piping, equipment, and containers inside and outside the facility (i.e., Buildings 731 and 778);
- segregate IDCs, and gram estimate waste;
- decontaminate remaining structure;
- perform final radiological surveys; and
- demolish structure.

Decommissioning the facility ultimately requires that all equipment, systems, and structures be dismantled and removed or demolished. These activities are described and analyzed in this document and are, therefore, not considered a change to the facility as described in this document.

In general, decommissioning activities start with removing Zone I/IA enclosures (e.g., piping, ducts, gloveboxes, and tanks) and associated components in the modules. Work control documents contain instructions for monitoring and rebalancing ventilation systems as the work is performed. Once the Zone I/IA enclosures are gone, the Zone I/IA ductwork will be removed from the module. Ductwork removed from a module will transition across a wall or ceiling and continue in the associated plenum area. The Zone I/IA ductwork in the plenum area will be removed back to the Zone I/IA filter plenum. During this process, the contaminated portion of the plenum will be isolated and the plenum fans shut down. The filters will be removed and then the plenum will be size reduced in place or removed.

Zone II ductwork will also be removed from the module during this stage. Internal walls will be removed along with the Zone II ductwork as the ductwork transitions across the walls. After structural decontamination and final surveys are complete, the remaining structure will be demolished.

Decommissioning activities that explain or support assumptions in the accident analysis are discussed below.

4.5.2 Remove Piping

This section provides the likely sequencing on how piping or tubing will be removed from Buildings 707/707A. The work will be performed in accordance with approved Integrated Work Control Program (IWCP) Packages. A section of piping will generally be removed as follows:

- Tap and drain (if necessary);
- Cut and remove sections; and
- Package waste in accordance with approved packaging procedures.

4.5.3 Remove Gloveboxes

This section provides an overview of how gloveboxes will be removed from Buildings 707/707A. The work will be performed in accordance with approved IWCP

Packages. A glovebox or a section of a glovebox will generally be disconnected and removed from the ventilation system and other utilities as follows:

- Isolate interfacing systems (e.g., utilities, electrical, etc.);
- Decontaminate and apply fixative (as appropriate);
- Disconnect glovebox;
- Wrap glovebox in plastic, if necessary, for contamination control;
- Move and stage gloveboxes; and
- Size reduce gloveboxes (some gloveboxes will be size reduced in-situ to access large equipment), as necessary, to meet packaging requirements.

4.5.4 Remove Tanks

This section provides the general sequence on how tanks and associated piping will be removed from Buildings 707/707A/778. The work will be performed in accordance with approved IWCP Packages. Pencil, raschig ring, and other tanks will generally be disconnected and removed from associated piping and vent systems as follows:

- Drain residual liquids;
- Remove Raschig rings (if necessary);
- Align valves to isolate feed, drain and vent lines;
- Unbolt or cut associated drain, feed, and vent lines;
- Decontaminate and apply fixative as appropriate; and
- Wrap in plastic as directed by the Radiological Protection Program;
- Size reduce tanks, as required to meet waste packaging requirements.

4.5.5 Remove Ductwork

This section provides an overview on how ductwork will be removed from Buildings 707/707A/778. The work will be performed in accordance with approved IWCP Packages. Sections of ductwork will be generally removed as follows:

- Identify ductwork section to be removed. Ductwork that will be packaged as SCO will generally be cut in lengths to fit into an IP-1 cargo container. Sections that will be packaged as TRU or LLW may be cut in lengths that fit directly into waste containers, but may be cut in longer sections and then moved to a size reduction tent or other location for further size reduction.
- Configure the ventilation to support duct removal.
- Unbolt flange or cut the duct using nibblers, saws, grinders, torches, etc., and remove the section.
- Rebalance ventilation air flow as needed.
- Package ducts as waste or move to a staging, or size reduction area, using lift tables, carts, etc.

4.5.6 Size Reduction Areas

This section provides general detail on how components (e.g., gloveboxes, tanks, ductwork, and piping) from 707/707A/778 will be size reduced. The work control documents provide general details on how to size reduce components, but specific details of how to dismantle or cut up each component will be made on the floor by Decommissioning workers and Radiological Control Technicians.

Special structures and equipment (e.g., inner tent chambers, personal protective equipment, ventilation systems) are used to control contamination and protect the workers during dismantling and cutting. Many of the hazards associated with decommissioning activities (e.g., radioactive material, combustible materials, ignition sources) tend to concentrate around

size reduction activities due to the design of the size reduction confinement structure and the nature of the activity.

Size reduction areas may be maintained negative with respect to the surrounding area and provide contamination control during routine size reduction operations. They may have additional filtration or containment features, but are not credited with mitigating the consequences of accidents (e.g., spills, fires) since these are typically Zone I/IA structures. However, understanding the configuration is important for modeling accident scenarios. Some of the tent configurations, cutting techniques, and practices are discussed below:

Size Reduction Tent Configurations

Plastic Tents may be used for contamination control during general disassembly and size reduction activities.

In Situ Tents will be used as required for contamination control during in-place size reduction of tanks and gloveboxes using mechanical and thermal cutting techniques. In Situ tents will vary in size depending on the size and number of the components.

Size Reduction Techniques and Practices

- Manual disassembly (e.g., unbolt or unscrew mechanical fasteners) may be used to dismantle components that are held together with mechanical fasteners.
- Mechanical cutters (e.g., nibblers, saws, shears) are generally used to cut components into smaller pieces.
- Thermal cutters (e.g., oxy-acetylene, Plasma Arc, Magnafusion) are used to cut carbon and stainless steel components (e.g., gloveboxes, tanks, ductwork, and plenums) into smaller pieces. Magnafusion may be used for difficult jobs (e.g., mixed metal and refractory, thick components).

4.5.7 Filter Plenums/Units

This section provides more detail on how the 707/707A filter plenums/units will be dismantled. The work will be performed in accordance with approved IWCP packages. Filter plenums/units that cannot be adequately decontaminated without radiological controls may be dismantled as follows:

- Shut down plenum fans.
- Remove filters from the filter plenum.
- Install a size reduction tent around the remaining contaminated portion of filter plenum.
- Size reduce the plenum inside tent (e.g., using saws, nibblers, and plasma arc cutters), and package the size reduced plenum.
- Alternate removal approaches may be utilized and evaluated via the Unreviewed Safety Question Determination Process.

4.5.8 Structural Decontamination

This section provides more detail on how structural decontamination activities will be performed. Structural decontamination activities will be performed in accordance with approved IWCP Packages. Structural decontamination work will generally be performed after the area is Operationally Clean. The types of activities involved in structural decontamination are discussed below:

Highly Contaminated Areas

Highly contaminated concrete structures will be decontaminated prior to final surveys, to maintain building confinement if necessary. The activities include:

- Identify highly contaminated sections of concrete using NDA scans or by taking concrete core samples.
- Decontaminate or size reduce concrete using scabblers, saws, hydrolasers, or jackhammers and package as waste.

- Soil below highly contaminated sections of concrete floors may also be excavated and packaged as waste by Environmental Restoration personnel using hand tools and power equipment (e.g., backhoes).

Structural Decontamination

- Remove contaminated surfaces using scabblers, hydrolasers, hydrolances, and grit blasters.
- Package and dispose of waste in accordance with Site procedures.
- Perform final surveys.

4.5.9 Structural Demolition

707/707A and Structures

- Demolish concrete walls, roofs, and columns using excavator-mounted buckets, claws, jackhammers, and explosive charges.
- Package and dispose of waste in accordance with Site procedures.

4.5.10 Decontaminating and Dismantling Systems and Equipment outside Facilities

This section provides an overview of how contaminated systems or structures outside Building 707/707A will be dismantled. The work will be performed in accordance with approved IWCP Packages. These systems or structures will generally be dismantled as follows:

Contaminated Equipment and Structures (e.g., 731, 732, and 707/778/777 chainveyor section)

- Build a confinement control enclosure, if necessary, as directed by Radiological Engineering.
- Dismantle and remove contaminated equipment as necessary and package as waste.

- Decontaminate and size reduce (as necessary) concrete and metal structures and package as waste.

4.6 REFERENCES

- 4-1 *Rocky Flats Environmental Technology Site Safety Analysis Report (Site SAR)*,
Revision 2, February 2000
- 4-2 *Site Transportation Safety Manual*, MAN-T91-STSM-001, Revision 0.
- 4-3 *Building 707 Preliminary Hazards Analysis*, Revision 3, May 2001.
- 4-4 *Criticality Safety Evaluation*, RDH-008, Rev. 0, NMSL/CSOL 01-080, Criticality
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